AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An endoscope system for taking images of an inside of an object, comprising:

an omnidirectional camera~~a camera~~ operable to take a plurality of images of the inside of the object in a living body, which is capable of motion; and

an image generation unit operable to generate a panoramic image of the inside of the object by performing a video mosaicking process, a motion correction process, and an image modification process through energy minimization on the plurality of images obtained by said omnidirectional camera, said processes being intended for pasting the images, estimating camera motion, correcting previously definable motion in the living body, and correcting previously indefinable internal deformation in the living body,

wherein said image generation unit is operable to generate the panoramic image such that the panoramic image has a fixed visual angle with respect to each of directions perpendicular to a traveling direction of said omnidirectional camera, by performing the video mosaicking process on the plurality of images obtained by said omnidirectional camera.

2. (Withdrawn - Currently Amended) The endoscope system according to claim 1, wherein said image generation unit includes:

a motion estimation unit operable to estimate the motion of said omnidirectional camera based on the images of the inside of the object taken by said omnidirectional camera; and

a panoramic image generation unit operable to generate the panoramic image of the inside of the object from the images taken by said omnidirectional camera based on the estimation result for the motion of said omnidirectional camera.

3. (Withdrawn - Currently Amended) The endoscope system according to claim 2, wherein said motion estimation unit includes:

a corresponding point detection unit operable to express an observation point of said omnidirectional camera in a spherical coordinate system and detect corresponding points for the observation point from the plurality of images obtained by said omnidirectional camera; and

a motion parameter estimation unit operable to estimate a motion parameter expressing the motion of said omnidirectional camera based on a plurality of the corresponding points.

4. (Withdrawn - Currently Amended) The endoscope system according to claim 2, wherein said motion estimation unit includes:

a camera motion estimation unit operable to estimate the motion of said omnidirectional camera from two temporally different images obtained by said omnidirectional camera by using an epipolar constraint condition; and

a camera motion correction unit operable to correct the motion of said omnidirectional camera estimated by said camera motion estimation unit by performing a bundle adjustment process using the plurality of temporally different images obtained by said omnidirectional camera.

5. (Withdrawn) The endoscope system according to claim 4,

wherein said camera motion correction unit is operable to perform the bundle adjustment process by approximating a change inside the object due to segmentation movement by a sine wave.

6. (Withdrawn) The endoscope system according to claim 4,

wherein said camera motion correction unit is operable to perform the bundle adjustment process by approximating a change inside the object due to peristalsis movement by movement of a soliton.

7. (Withdrawn - Currently Amended) The endoscope system according to claim 4, wherein the object is a cylindrical object, and

said panoramic image generation unit is operable to generate a cylindrical-shaped model of the object and fit the plurality of images obtained by said omnidirectional camera to the cylindrical-shaped model based on a feature point used at the time of estimating the motion.

8. (Withdrawn - Currently Amended) The endoscope system according to claim 2, further comprising

a position/attitude sensor operable to measure a self-position or attitude,

wherein said motion estimation unit is operable to estimate the motion of said omnidirectional camera in consideration of a measurement result by said position/attitude sensor.

9. (Currently Amended) The endoscope system according to claim 1,

wherein said image generation unit includes:

a feature region cutout unit operable to cut out a plurality of feature regions having a predetermined size from each of the plurality of images obtained by said omnidirectional camera; and

a panoramic image generation unit operable to define ~~predetermined~~ energy based on the plurality of feature regions included in each of the plurality of images, associate the plurality of feature regions between the plurality of images such that the energy is minimized, and generate a panoramic image of the inside of the object based on the association result.

10. (Withdrawn - Currently Amended) The endoscope system according to claim 9,

wherein the ~~predetermined~~ energy is determined based on differences in pixel value between the plurality of feature regions included in each of two temporally successive images.

11. (Withdrawn - Currently Amended) The endoscope system according to claim 9,

wherein the ~~predetermined~~ energy is determined based on differences in area between triangular patches obtained by connecting the plurality of feature regions included in each of two temporally successive images.

12. (Withdrawn - Currently Amended) The endoscope system according to claim 9,

wherein ~~said camera is an omnidirectional camera, and~~ the ~~predetermined~~ energy is determined based on a difference between (i) a coordinate obtained by correcting, based on a movement component of said omnidirectional camera, a coordinate of a great circle which appears in an image after a first image taken by said omnidirectional camera is transformed in a spherical coordinate system with its center at a viewpoint of said omnidirectional camera, and (ii) a coordinate of a great circle which appears in an image after a second image temporally successive to the first image and taken by said omnidirectional camera is transformed in the

spherical coordinate system.

13. (Withdrawn - Currently Amended) The endoscope system according to claim 9,

wherein the ~~predetermined~~ energy is determined based on a degree of deviation of a plurality of control points, in a second image taken by said omnidirectional camera, which respectively correspond to a plurality of control points selected from a first image taken by said omnidirectional camera.

14. (Currently Amended) The endoscope system according to claim 9,

wherein the ~~predetermined~~ energy is determined based on a degree of deviation between a plurality of control points selected from a first image taken by said omnidirectional camera and a plurality of control points, in a second image taken by said omnidirectional camera, which respectively correspond to the plurality of control points selected from the first image.

15. (Currently Amended) The endoscope system according to claim 9,

wherein the plurality of feature regions are regions~~, among~~ which are included in the plurality of regions having ~~a predetermined~~the predetermined size included in each of the images, and in which ~~the squared~~a squared sum of derivatives of pixel values is greater than a predetermined threshold value.

16. (Cancelled)

17. (Currently Amended) The endoscope system according to claim 1,

wherein said omnidirectional camera is mounted on a tip of a probe that is to be inserted into a digestive organ.

18. (Withdrawn - Currently Amended) The endoscope system according to claim 1,

wherein said omnidirectional camera is enclosed in a capsule that can be swallowed by a human or an animal.

19. (New) An endoscope system for taking images of an inside of an object, comprising:

a camera operable to take a plurality of images of the inside of the object in a living body, which is capable of motion; and

an image generation unit operable to generate a panoramic image of the inside of the object by performing a video mosaicking process, a motion correction process, and an image modification process through energy minimization on the plurality of images obtained by said camera, said processes being intended for pasting the images, estimating camera motion, correcting previously definable motion in the living body, and correcting previously indefinable internal deformation in the living body,

wherein said image generation unit includes:

a feature region cutout unit operable to cut out a plurality of features regions having a predetermined size from each of the plurality of images obtained by said camera; and

a panoramic image generation unit operable to define energy based on the plurality of feature regions included in each of the plurality of images, associate the plurality of feature regions between the plurality of images such that the energy is minimized, and generate a panoramic image of the inside of the object based on the association result, wherein

the plurality of feature regions are regions which are included in the plurality of regions having the predetermined size included in each of the images, and in which a squared sum of derivatives of pixel values is greater than a predetermined threshold value.